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THE BIOSTRATIGRAPHIC ANALYSES OF THE FAUNAS OF THE NACHOLA AREA AND SAMBURU HILLS. NORTHERN KENYA

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ABSTRACT To examine and refine the preliminary K-Ar dating results, the faunas of Nachola and Samburu Hills are analyzed biostratigraphically. It is confirmed that the fauna of Nachola is in the pre-Hipparion stage (earlier than 10 ± 0.5 m.y.). The fauna from the Namurungule Formation of Samburu Hills is in the post-Hipparion stage (later than 10 ± 0.5), not as advanced as that of Lukeino (6.5 m.y.) and most like those from Ngeringerowa and Nakali. Therefore, it is supposed that the age of the Namurungule fauna is 9 ± 1 m.y..

INTRODUCTION

Preliminary K-Ar dating results indicate that the Nachola and Numurungule Formations are Miocene in age. Two analyses made for basalts of the Nachola Formation, suggest an age of about 11 m.y. for the Emuruilem Member, on the basis of samples from site BG "X" (Matsuda *et al.*, 1984). The Namurungule Formation is underlain by basalts of the Aka Aiteputh Formation from which two K-Ar age determinations were obtained; 12.0 and 14.6 m.y.. From basalts of the Kongia Formation which unconformably overlies the Namurungule Formation (Makinouchi *et al.*, 1984), two dates (6.3 and 6.4 m.y.) were obtained, suggesting an upper Miocene age for Namurungule strata. The fauna found in the strata generally confirms these estimates and permits a degree of refinement of their ages to be made.

A substantial drawback to understanding upper Miocene biostratigraphy in East Africa is the relatively poor fossil record for this period. Fauna from Namurungule, for example, is closely related to only two or three other known faunas principally from Nakali and Ngeringerowa (Pickford, 1975). Nevertheless, it has been possible to estimate degrees of differences from earlier and later sites (e.g. Ngorora, Lukeino, Lothagam) to obtain an assessment of the probable age of the Namurungule sediments. The Nachola sediments on the other hand have so far yielded such a sparse fauna that the confidence limits of age estimates based on faunal evidence are not very satisfactory.

NACHOLA

The Nachola fauna consists predominantly of long range taxa (Table 1) which are of little use in determining biostratigraphic relationships. The giraffids and tragulids are too poorly known to

yield much data, and the primates although better represented as fossils are not well understood in terms of their biostratigraphic importance. The large species, represented by more than twenty specimens appears to represent *Kenyapithecus*, and is closest is known dental anatomy of *K. africanus*, which is otherwise known from sites in Western Kenya. A *Kenyapithecus* like primate is, however, known from Ngorora (Leakey, 1970). Consequently the biostratigraphic meaning of Nachola assemblage cannot be properly assessed using currently available evidence.

Probably of some significance is the fact that out of more than 200 fossils collected at Nachola, not a single *Hipparion* specimen has come to light, suggesting that the Nachola sediments may have accumulated prior to the arrival of *Hipparion* in the area. Presently available evidence indicates that the age of the *Hipparion* datum in East Africa is about 10.5 ± 0.5 m.y. (Matsuda *et al.*, 1984). The K-Ar age of Nachola (c. 11 m.y.) may therefore be acceptable, but additional levels both below and above the Emuruilem Members, need to be dated. What is needed is a considerably better faunal assemblage. In general terms, however, the Nachola fauna is middle Miocene in aspect.

SAMBURU HILLS

The siliceous limestone Member of the Aka Aiteputh Formation has yielded a sparse fauna of little biostratigraphic meaning (Table 2). The presence of *Palaeotragus* probably places it somewhere between 8 and 14 million years.

The Namurungule Formation, in contrast, has yielded a vertebrate fauna consisting of at least 21 taxa, several of which are of biostratigraphic significance (Nakaya *et al.*, 1984) (Table 3). Two species of *Hipparion* are commonly represented at many sites in the formation, indicating an age of less than 10.5 ± 0.5 m.y. for the sequence. The primitive giraffids and gomphotheres suggest that the strata are appreciably earlier than the sites of Lothagam and Lukeino (Pickford, 1975). The suid is a primitive species of *Nyanzachoerus* which possesses low crowned cheek teeth, while hipopotamids are represented by *Kenyapotamus* sp.. The carnivore fauna is not as advanced as that of Lukeino (6.5 m.y.), but more closely recalls Ngorora (c. 11 m.y.). If the identifications of

Table 1. Fauna of the Emuruilem Member, Nachola Formation.

Pisces	Clariidae
Crocodylia	<i>Crocodylus</i>
Trionychidae	<i>Trionyx</i>
Pelomedusidae	cf. <i>Pelusios</i>
Aves	indet.
Primates	<i>Kenyapithecus</i> cf. <i>africanus</i>
	? <i>Cercopithecoidea</i>
Gomphotheriidae	indet.
Deinotheriidae	<i>Deinotherium</i> sp.
Rhinocerotidae	indet.
Giraffidae	indet.
Tragulidae	indet.

Table 2. Fauna of the Aka Aiteputh Formation, Samburu Hills.

Gastropoda	<i>Melanoides tuberculata</i>
Trionychidae	<i>Trionyx</i>
Deinotheriidae	<i>Deinotherium</i>
Gomphotheriidae	indet.
Giraffidae	<i>Palaeotragus</i> sp.
Bovidae	indet.

Table 3. Faunal of the Namurungule Formation, Samburu Hills.

Pisces	Clariidae
Crocodylia	<i>Crocodylus</i>
Pelomedusidae	cf. <i>Pelusios</i>
Trionychidae	<i>Trionyx</i>
Varanidae	<i>Varanus</i>
Ophidia	indet.
Aves	indet.
Rodentia	cf. <i>Paraphiomys</i> sp.
Hominoidea	gen. nov., sp. nov.
Orycteropodidae	<i>Orycteropus</i> sp.
Deinotheriidae	<i>Deinotherium</i>
Gomphotheriidae	<i>Tetralophodon</i>
Hyaenidae	<i>Percrocuta</i>
	<i>Ictitherium</i>
Rhinocerotidae	<i>Brachypotherium</i> cf. <i>lewisi</i>
	<i>Ceratotherium</i> sp.
Chalicotheriidae	indet.
Equidae	<i>Hipparion primigenium</i>
	<i>Hipparion sitifense</i>
Suidae	<i>Nyanzachoerus</i>
Hippopotamidae	<i>Kenyapotamus</i>
Giraffidae	<i>Palaeotragus</i> sp.
	? <i>Samotherium</i> sp.
Tragulidae	<i>Dorcatherium</i> sp.
Bovidae	<i>Gazella</i> sp.
	<i>Pachytragus</i> cf. <i>solignaci</i>
	<i>Miotragocerus</i> sp.
	<i>Palaeoreas</i> sp.
	<i>Neotragini</i> sp.

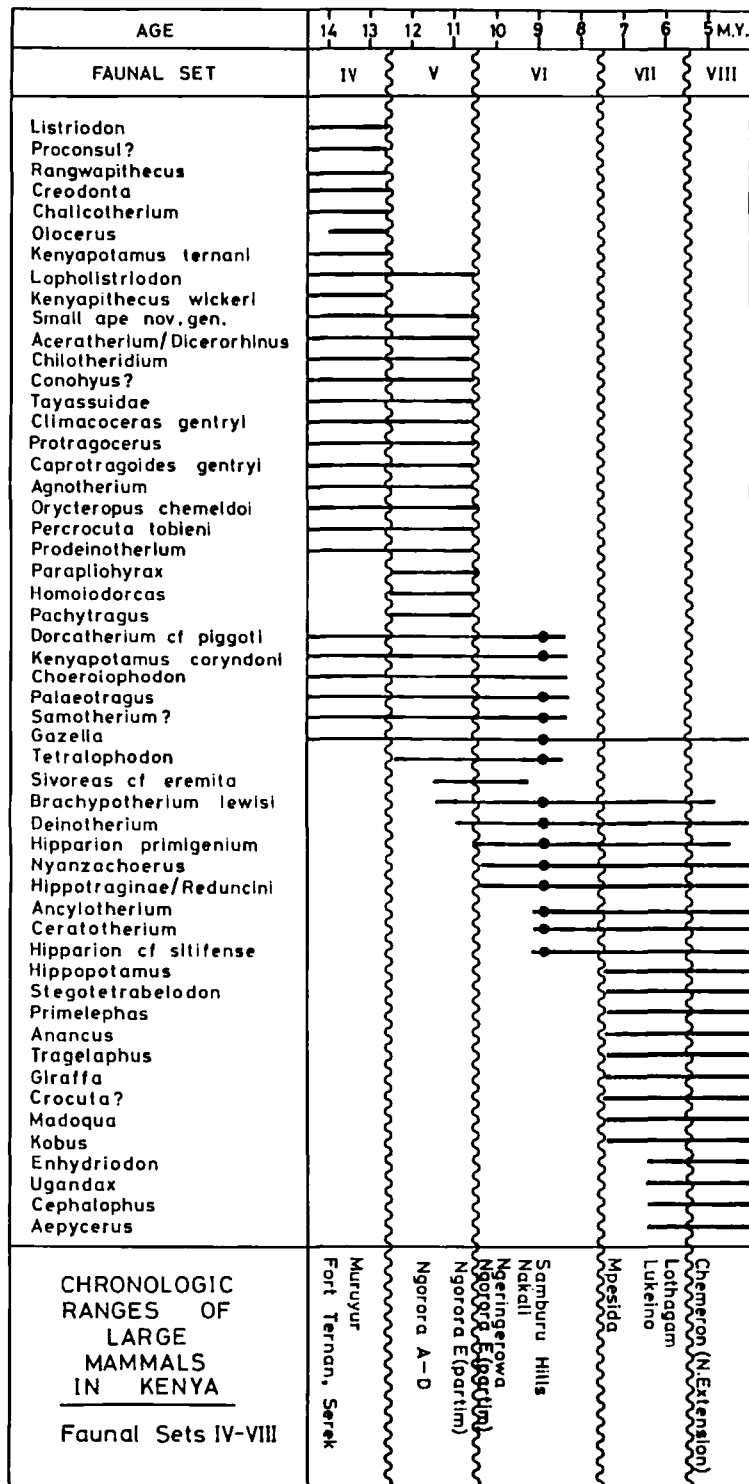


Fig. 1. Chronologic distribution ranges of large mammals in Kenya, for the period from middle to late Miocene.

the *Ceratotherium* and *Brachypotherium lewisi* are correct then these would be the earliest records of these taxa. A summary of these views is given in Figure 1 which illustrates the intermediate position of the Namurungule fauna between those of Ngorora on the one hand and Lukeino on the other. In general features the Namurungule fauna is most like those from Ngeringerowa and Nakali (Aguirre and Leakey, 1974), and is consequently placed in Faunal Set VI of Pickford (1981). An age of about 9 ± 1 m.y. is indicated for this faunal on a basis of its biostratigraphic aspect. This estimate is in accord with the K-Ar dates obtained from the underlying and overlying volcanic sequences.

KONGIA FORMATION

The fauna from Kongia is of little use for biostratigraphic purposes. Only one mammal specimen (*Hippopotamus*) has so far been collected from the unit, which is of little value, except perhaps to suggest that the Kongia sedimentary intercalations are probably less than about 7 m.y., the earliest record of the genus *Hippopotamus*. This accords with preliminary estimates based on K-Ar dates.

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